Business Day

The New York Times

For Shakespeare, Just Log On

Large PC Libraries Are Being Developed

By JOHN MARKOFF

The development of a nationwide data network will allow personal computer users to tap sources as large as the Library of Congress or receive their own personalized electronic newspapers.

Several innovations, taken together, have already demonstrated that searching vast computer data bases can be easier than consulting a card catalogue, and not nearly as difficult or expensive as computer searches are today. Computer users might read some Dickens more readily than they could check out David Copperfield from the local library.

Those in the industry say that users with little computer skills will soon be able to search through several terabytes of information, or several trillion characters of text, in seconds. The Library of Congress, with 80 million items, contains an estimated 25 terabytes of information.

Already, an experimental computer library has linked 150 universities to 40 sources of information, ranging from National Institutes of Health data to corporate documents and Shakespeare's plays. New software allows users to browse or zero in on particular information.

As methods of retrieving information are standardized and perfected, industry executives and computer scientists say, thousands of new services, ranging from electronic newspapers to the computer equivalent of free public libraries, will blossom. "Everyone is realizing how important it is to get into the mass market for information," said Thomas Koulopoulos, president of Delphi Consulting Group, a Boston market research firm.

Such ready access to huge amounts of computerized information has been the dream of many in the industry. But a lack of computing power, effective software and high-speed digital networks has stalled progess until recently.

If many of the technical problems are being solved, major business and political disputes remain. The researchers acknowledge that they must resolve several questions of privacy and pricing before they can put the new methods to commercial use.

Many sources of information, like government documents, might be available free, but other services, including electronic newspapers, will be available only to those who pay. The industry has yet to settle on ways to protect and charge for intellectual property in a computer network where information can be copied instantly. But to encourage progress, the Thinking Machines Corporation, a Cambridge, Mass., supercomputer manufacturer, has made its software available at no charge.

Some industry enthusiasts say the new technology will transform the

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Mike Theiler for The New York Times

Brewster Kahle was the leader of the development team at the Thinking Machines Corporation for a nationwide computerized library system. His team's software links a CM2A Connection Machine, left, with a personal computer or work station like the Apple Macintosh II at right. Using high-speed data highways, the two machines can function together although they may be thousands of miles apart.

For Shakespeare, Just Log On

Continued From First Business Page

way computerized information is sold Mitchell Kapor, the founder of the Lotus Development Corporation, predicts the growth of a new industry as significant as the personal computer business. Some companies, like Dow Jones & Company, that already provide computerized information over telephone lines have taken part in developing the new computer library.

The Search Is Simplified

In 1989, Thinking Machines enlisted the support of Dow Jones, Apple Computer Inc. and the KPMG Peat Marwick accounting and consulting firm to design the computer library, called Wide Area Information Servers, or WAIS (pronounced ways). The system permits computer users to quickly search through a huge volume of information even if it is stored at several distant locations.

The system lets users conduct searches by typing common English phrases instead of more complicated computer commands. While current systems like Dialog and Nexis require users to specify precisely the information they want, the new system can respond to a user's inferences. It initially presents a sample list of documents. The user chooses one or several, and then a "relevance feedback" program presents other documents most like the ones selected.

"This solves the problem of how to get to the information you need, getting not too much and not too little," said Esther Dyson, editor of Release 1.0, a computer industry newsletter.

> It will soon be possible to search through millions of items in seconds.

This is a sharp contrast to the way services operate today, Ms. Dyson said. A computer user may need to call seven or eight separate data bases depending on the kind of information needed.

The WAIS system lets users of Apple personal computers harness a network of Thinking Machines supercomputers and smaller "server" computers to search data bases stored by Dow Jones, KPMG and several corporations and universities. Users can also read electronic mail, enter their corporate electronic libraries and summon up a wide variety of documents, newspapers and magazines.

A 'Corporate Memory'

At Thinking Machines, the WAIS system serves as a "corporate memory," allowing employees to retrieve memos, documents and other internal information. Employees who may not be working together can share expertise.

"If someone did something in Los Angeles and I'm sitting in San Francisco, I may not know about the work," said Robin Palmer, a senior manager at Peat Marwick.

WAIS delivers information over the Internet, a collection of 2,600 high-speed public and private computer networks. This Government-sponsored system of data highways is rapidly being improved and turned to commercial uses.

The market for software that allows the rapid retrieval of computerized text is small but growing, according to industry analysts. In 1989, the United States had fewer than 60,000 users; by the next year, total sales were about $120 million. The Delphi Consulting Group expects the market to grow to 160,000 users and $235 million by 1992.

"Information retrieval technology is starting to spread from supercomputers all the way down to personal computers," said Brewster Kahle, a Thinking Machines scientist who has led the WAIS experiment.

The WAIS system is built on a procedure for retrieving information developed by librarians who initially set out to computerize their card catalogues. The procedure — known in the field as Z39.50 — now has the support of the Library of Congress, Apple, Sun Microsystems Inc., Next Inc., Dow Jones and Mead Data Central.

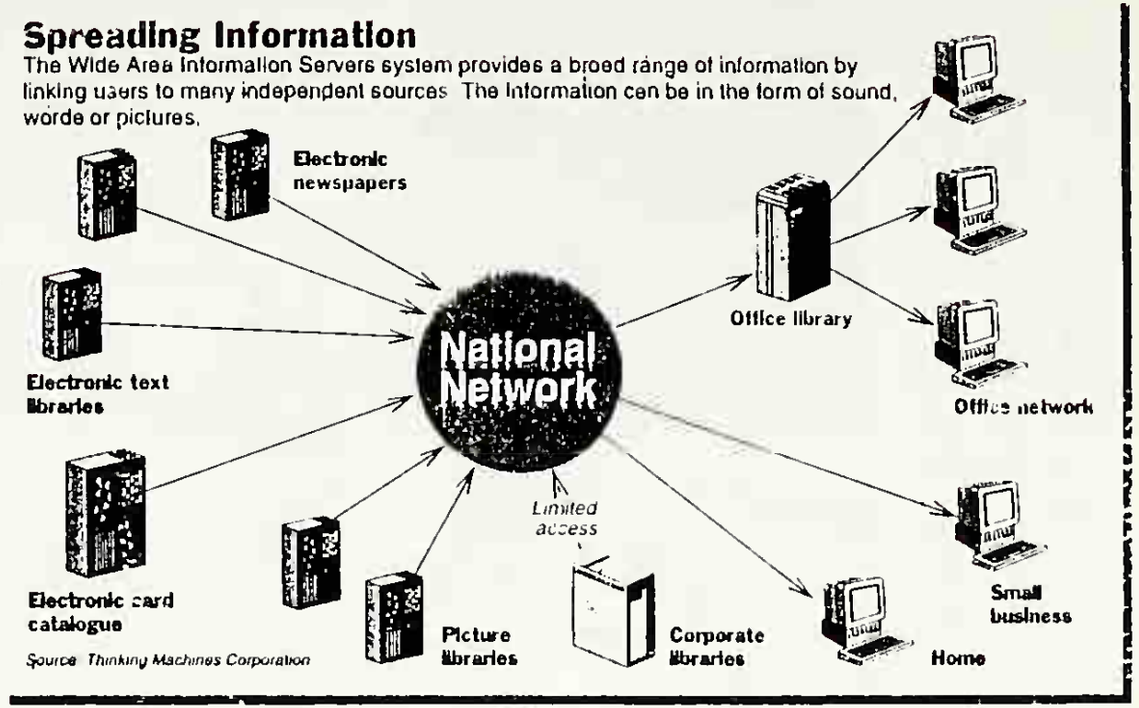
In the future, a special directory or "white pages" will keep an up-to-date list of all the separate sources on the network.

Apple has its own electronic library project, borrowing its name, Rosebud, from the movie "Citizen Kane." The three-year old project is based on the WAIS system, but adds features including the ability for a user to develop a personalized electronic newspaper.

Rosebud uses special programs — called "reporters" — that let customers specify the kinds of information and news they want to retrieve from the WAIS system every day. Researchers at Apple's Advanced Technology Group said that in the future the necessary retrieval software might be a standard part of a computer's operating system.

They expect improvements in the Internet computer network to greatly lower the cost of information searches, promoting the introduction of many new services. The Government proposes to expand and improve Internet by financing a National Research and Education Network, or NREN, that could extend high-speed computer links into schools and communities across the country.

"With things like NREN, everything could change overnight," said Tim Oren, an Apple researcher.



Compact Disks and Players for the Eyes as Well as the Ears

By EBEN SHAPIRO

Suppose for a research project you wanted to hear part of John F. Kennedy's inaugural address, then see pictures of all the United States Presidents. Now you can do just that at home or in the office with a new souped-up personal computer and a single new compact disk.

These new computers and disks are the latest generation of equipment for storing and portraying information electronically, or what the computer and electronics industries call electronic publishing or multimedia computing. By taking advantage of the massive storage capacity of compact disks, a single disk, or electronic book, is able to store what would take 250,000 pages in ordinary books. And some even offer video.

Besides new disks published by the companies that make the machines, a number of software companies are publishing disks for research, education and entertainment.

Recording Not Possible

The disks cannot be recorded on, but come crammed with information, brimming with music, color photographs, text and even moving images, all stored electronically. For instance, one disk is an electronic version of Bartlett's Familiar Quotations that allows listeners to hear John F. Kennedy exhorting citizens to rise above self-interest. The same disk can also scan the speeches of half a dozen other statesmen and thinkers on the same subject, starting with Jean Jacques Rousseau in 1762.

Within the month, the Sony Corporation, Philips N.V. of the Netherlands and two United States computer makers, the Tandy Corporation and Commodore International, will be selling compact disk read only memory players — or CD-ROM players — to play disks like these. They will cost $550 to nearly $3,000. The disks themselves cost about $50 to $800.

As with any emerging technology, there are pitfalls with CD-ROM. No standard format yet exists for electronic publishing. That raises the problem of whether or not to buy what might become the electronic publishing version of the Betamax videocassette recorder. You could then discover that most of the titles you want are for other formats.

Sony

ABOVE Sony's Data Discman ($550) is portable, and many reference materials can be used with it.

Tandy

RIGHT Tandy sells a multimedia computer complete with a built-in CD-ROM player for $2,800.

For the most part, each company is introducing machines unable to play titles developed for a rival's machines, forcing consumers to guess which company will prevail or simply wait until a winner emerges. Sony is not even committed to a single format, and will offer two machines that are incompatible.

Most of the devices are not directly comparable. One Sony product, the Data Discman, is portable and has a small screen, while the version Philips is marketing hooks up to a television set and is operated by a remote-control unit.

But as a unifying principle, the machines each rely on the massive storage capacity of compact disks, essentially the same kind of platters music lovers know for their pristine, hiss-free recordings. Compact disk player technology lies at the heart of the various electronic publishing machines. But technological advances have allowed disks to store text and images as well.

A single five-inch disk can hold up to 250,000 pages of printed text, or 100,000 images. It takes just two disks to list all the White Pages in the United States.

Machines open up a motherlode of information.

Up to now, the market for electronic publishing has been limited mainly to the Federal Government and large corporations. For instance, the Navy has bought thousands of the players to reduce the many tons of paperwork that accompany each ship to sea. Until recently, the small consumer market for CD-ROM players consisted of machines connected to personal computers, costing about $2,000.

Sony recently began offering its Laser Library, consisting of a CD-ROM player and six disks, for $700. Among the disks is "Mammals: A Multimedia Encyclopedia," produced by the National Geographic Society with I.B.M. Using the computer keyboard to operate the disk, a child can call up information on a Tasmanian Devil and push a button and hear a recording of the marsupial's eerie bark. Another command calls forth a short film clip of a wombat running across a grassy field.

To set up the Laser Library, the cover of the computer has to be removed and a board, or card, with additional circuitry, installed.

Tandy's Answer

For people who are uncomfortable tampering with the innards of their computers, Tandy sells a computer with a CD-ROM player already installed, just as a hard drive or a modem is in many computers. A number of experts say most computers will come equipped with CD-ROM drives in a few years.

The Tandy multimedia computer costs $2,800. To upgrade a personal computer to play the disks, Tandy sells a kit for $800.

It is also possible for a technically sophisticated person to a multimedia computer for far less than $2,800 by buying the parts separately.

An Electronic Bookshelf

The Microsoft Corporation, the world's largest software company, has updated Bookshelf, its electronic reference work, to deftly show off Tandy's hardware. Since 1987, Microsoft has published for CD-ROM a text-only compendium of reference works, including a dictionary, a book of quotations and a thesaurus.

Besides the Bartlett's with recorded quotations, an atlas in the updated version contains detailed color topographical maps. After viewing the mountain ranges and rivers of Peru, a browser can issue a command and listen to a recording of the country's national anthem.

The same disk includes a version of Compton's encyclopedia that has a lesson on plate tectonics, complete with animated diagrams depicting the shifting land masses. The disk sells for $195.

Sony soon plans to introduce the Data Discman, a portable, one-and-a-half pound computer that plays three-inch disks. The Data Discman costs $550 and comes with three disks. Sony plans to make available for the Discman reference works, movie guides and airline schedules. Data Discman disks cannot be played on other machines, including the Sony Laser Library.

Commodore and Philips both have their own versions of multimedia machines, and they are designed for people not comfortable with computers. Each system is connected to a television set and operated by a remote control device. The Philips Compact Disc Interactive player and the Commodore CDTV both have a list price of $1,000, but will retail for about $800.

Both play disks containing games and reference works. Each system only plays disks that are specifically designed for it. They are sold in computer, electronics and department stores. The disks cost from $50 for a travel guide to $795 for Compton's multimedia encylopedia.

Guidepost

Let It Snow, Let It S

It's November, and time to think snow. Hardware stores and hon are brimming with equipment fo stoops, decks, sidewalks, path ways. Here are some examples devices must be used with outd heavy enough to run the device of the cord and the size of the r

Sn

Cost: $7 to $20. Suitable for wide scooop in lightweight h inches wide. For slightly hea shovel. New: S-shaped han (Ames's Lift-Rite, for $12) a some power models, use a ue's Snaug'r, for $39).

E

Cost: $80 to $120. Suitable decks. Will normally clear Electric Power Shovel by

Elec

Cost: $190 to $300. Suitab wide path, depending upor Electric Snow Thrower.

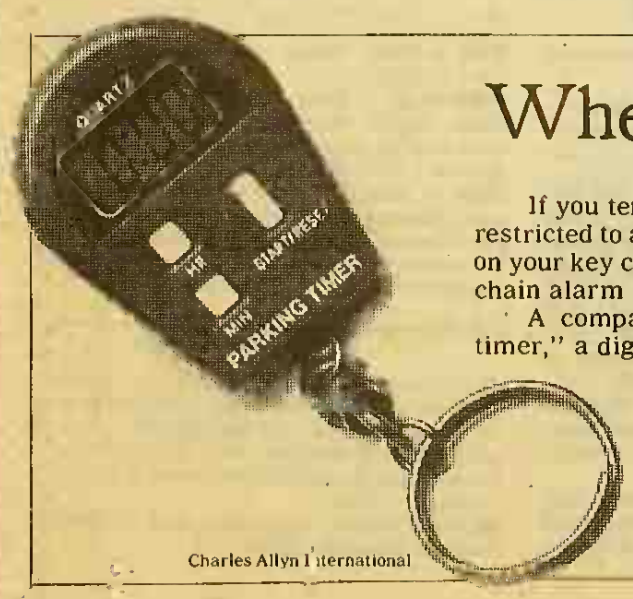
Gasoline-P

Cost: $300 to $1,200. Suital access to electrical outlet. C Homelite's 3-horsepower S horsepower Snow King for pelled, 10-horsepower Snov est snow. Options: Drift cutt

Attachmer

Cost: $200 to $500. Suitable ent types of blades or blowe and power.

Sources: Home Depot, True Value



Charles Allyn International

When the Meter Is Running

If you tend to park your car and forget about it in areas where parking is restricted to an hour or less, or if you park your car in metered spaces, an alarm on your key chain may be just the thing. Even if you have a watch alarm, a key-chain alarm could make an effective backup.

A company in West Hollywood, Calif., has a new product, a "parking timer," a digital stopwatch on a key chain. The timer can be set for up to 15 hours. After it is set, it will chime 10 minutes before your parking time is up, and again 5 minutes before. That's enough time to get to your car and move it or put another coin in the meter. It costs $4.95 plus $1 for shipping. Write: Charles Allyn International, 9005 Cynthia Street, West Hollywood, Calif. 90069. (213) 271-0391.

BUSINESS TECHNOLOGY

Advances on the Gyroscope Front

By ANDREW POLLACK

Special to The New York Times

SAN FRANCISCO — If it were not for gyroscopes, planes would lose their way, missiles would miss their targets and man would not have reached the moon.

Now, technological advances are making gyroscopes smaller, lighter and cheaper. The devices are moving beyond sophisticated military and aerospace instruments and into consumer products, where they might be used for everything from taking the jitter out of video camcorders to helping pull automobiles out of skids.

New Mouse for Computers

Among recent developments, Gyration Inc., a Silicon Valley start-up, this month introduced a computer mouse that operates in three dimensions. The hand-held device, containing two gyrators, controls the movement of objects on a video screen as the user waves it around in the air.

Gyroscopes, which most people have probably seen in toy form as a spinning top mounted within a steel-ring frame, are based on a principle of physics: a freely rotating body tends to maintain a fixed attitude, or angle in space, and tends to resist attempts to move it off its orginal course. Thus the spinning Earth, a giant gyroscope, maintains the same tilt on its axis throughout the planet's yearlong journey around the sun.

In industrial applications, a gyroscope of sufficient size can help stabilize an object containing one. More often, though, gyroscopes function like a compass needle, used as a part of a system for measuring movement — but three-dimensional movement, rather than the simple north-south measurement of a magnetic compass. The first practical application of gryoscopes came about 80 years ago when large versions began being used to orient the stabilizing and navigational systems of ships.

Current gyroscope technology is progressing on several fronts. In some cases, traditional spinning gyroscopes are being made smaller and lighter. But new types of gyroscopes that have no moving parts promise to have an even bigger impact.

Gyroscope-on-a-Chip

The ultimate goal, expected to be reached by the end of the decade: the gyroscope-on-a-chip, in which the sensing element and the electronics to analyze it would be included in a single piece of silicon the size of a thumbnail; produced in volume, such gyroscopes could lower the cost from the hundreds of dollars for today's smallest models to perhaps tens of dollars.

"Once you get a gyro and an accelerometer on a chip, you can let your imagination run," said Robert G. Brown, a consultant in Hillpoint, Wis., who studies the market for inertial navigation systems — as such devices are known among engineers. An accelerometer measures changes in speed in a linear direction, while a gyroscope measures changes in how fast something is rotating around one or more axes.

Uses in Surgery and Autos

Experts say, for instance, that microchip gyroscopes could be used to position surgical instruments precisely. In the military arena, the guided-missile concept might be miniaturized down to "guided bullets."

The automotive industry could represent one of the biggest markets. Today's antilock braking systems, for example, can detect the turning of individual wheels but cannot measure the sideways spinning of a car as it goes into a skid. A gyroscopic device could add this measuring capability, and several companies in the United States and Japan have prototypes under review by auto makers.

A current approach to making smaller gyroscopes is to shrink the conventional spin gyroscope. Gyration, based in Saratoga, Calif., has developed a spin gyroscope no larger than a roll of 35-millimeter photographic film — compared with most spinning gyros, which are the size of a soup can or larger.

Made of molded plastic, the device lends itself to mass production. Initially, however, the gyroscopes are expected to sell for between $100 and $1,000, depending on the required accuracy.

Yet, spinning gyroscopes, some of which contain 300 moving parts, are giving way to one-piece, solid-state gyros, which employ similar physical principles of inertia as a gyroscope but have no spinning wheel.

"Anything that spins these days, it's sort of like your old wristwatch," said Brad B. Sage, director of business development for the Systron Donner Company's inertial division, a gyroscope maker in Concord, Calif.

Several types of nonspinning small gyroscopes are beginning to reach the market. One approach is to use tiny tuning forks, which tend to keep vibrating in the same direction. As the forks are rotated, the energy changes in ways that can be detected by electronic sensors.

Systron Donner, a subsidiary of BEI Electronics Inc. of San Francisco, has begun to sell tuning-fork gyros smaller than golf balls, that are made from quartz crystals similar to those used in watches. The tuning forks are created using micro-mechanics, in which structures no larger than specks of dust are created with the tools normally used to make computer chips.

Outlook on Prices

Systron Donner's gyroscopes now cost $1,000 to $2,000 because they are being developed for military uses like missile guidance. But versions costing a few hundred dollars or less could reach the market within two years, predicted Mr. Sage, who said American and European car makers were testing his company's product and might begin incorporating it in braking systems as early as the 1995 model year.

Analog Devices Inc., a semiconductor company in Norwood, Mass., and some other companies have already produced accelerometers on a silicon chip. Gyroscopes on a chip are more difficult to produce, but work is under way, particularly at the nonprofit Charles Stark Draper Laboratory in Cambridge, Mass., considered the nation's leading research center on inertial navigation.

Some experts say that gyroscope prices will have to come down considerably for new applications to catch on. Auto makers, for instance, are not considered likely to accept sensors costing more than a few dollars.

Japan's Consumer Edge

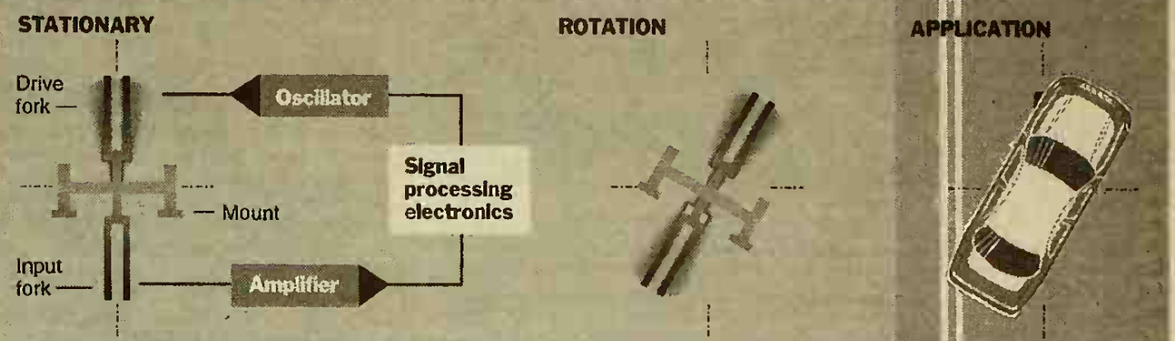
Some executives say American gyroscope producers will have trouble achieving low prices because development is still driven by the military, which requires products that are more accurate, more rugged and more expensive than most civilian applications would require. In Japan, companies are already making small and relatively inexpensive vibrating gyros, for such purposes as controlling robots and steadying lenses on camcorders.

Panasonic already has a gyroscopically equipped camcorder on the market in Japan and the United States. And several other Japanese makers of video camcorders are said to be adapting a vibrating gyro made by the Murata Manufacturing Company of Kyoto, Japan. Several auto makers are also evaluating Murata's device as part of the development work on anti-skid systems.

"The Japanese are trying the hardest at the low end," said David Klein, vice president of advanced product development at Litton Industries Guidance and Control Systems division in Woodland Hills, Calif. "The U.S. needs to move rapidly so it doesn't lose its business leadership in this area."

A Gyroscope With No Moving Parts

Gyroscopes made of tiny tuning forks and no bigger than golf balls are being used in missile navigation. Less expensive versions now under development might be used in anti-skid systems for automobiles.



When the gyroscope is stationary, only the drive fork vibrates in response to signals from an oscillator. The input fork, which vibrates only when the gyroscope rotates off its central axis, is linked to the processing electronics via an amplifier.

When the gyroscope is rotated in any direction, the resulting vibration of the input fork can be electronically analyzed to measure the angle and intensity of movement.

Such a gyroscope could be used to determine the angle of a car's skid and send signals to the braking and steering systems.

Source: Systron Donner

The New York Times

American Express to Buy 2 Top Supercomputers

By JOHN MARKOFF

Special to The New York Times

CAMBRIDGE, Mass., Oct. 29 — Executives of the American Express Company said today that they planned to purchase new massively parallel supercomputers from the Thinking Machines Corporation.

American Express's order for two of the machines was among nine sales commitments that Thinking Machines announced at a news conference in Cambridge, Mass., today as the company introduced the new computers.

Purchase plans were also announced by officials of Sandia National Laboratories, the Los Alamos National Laboratory and the National Center for Supercomputer Applications, as well as the Army High Performance Computing Research Center at the University of Minnesota; Schlumberger Ltd.; the University of California at Berkeley; the University of Wisconsin at Madison, and Syracuse University.

"We've crossed over an important line in terms of general acceptance of this technology," said Gary Smaby, an analyst at the Smaby Group in Minneapolis. Massively parallel computers harness thousands or even tens of thousands of off-the-shelf chips, breaking problems up into small parts that can be solved simultaneously.

Beyond Previous Supercomputers

They offer the best way to solve a series of scientific problems that are beyond the scope of previous supercomputers.

The new machine, known as the CM-5, is the first of a new generation of supercomputers that many industry executives expect will soon start to replace conventional systems based on a single processor or a small number of processors.

The CM-5's prices start at $1.4 million for a system that contains 32 processors and can be increased to a maximum of 16,000 processors. Each processor is a chip based on a design created by Sun Microsystems Inc., which supports up to four special math chips for scientific calculations.

An American Express official said the company saw massively parallel supercomputing as an important part of its information-processing strategy but was unwilling to say how the machines would be used.

A number of large corporations have begun experimenting with massively parallel supercomputers for a variety of applications from technical design to data analysis. Industry analysts said they thought American Express would use the machines to refine its analysis of cardholders' purchasing habits.

Mr. Cone said the company planned to install one machine at an American Express processing center in Phoenix and the other in Boston.

Thinking Machines also said today that it had entered into agreements with I.B.M. and Sun to assure a common programming language for scientific computing. One handicap in the supercomputer market is that there are few software standards that reach across different types of computer hardware.

Danny Hillis, co-founder and chief scientist of Thinking Machines, said the new machines were a step toward scaleability in scientific computing, that is, the ability to add additional processing power, an important quality which he said had been lacking from earlier designs.

Peak Speed to Be Played Down

"These days you can make the world's fastest machine by putting more microprocessors in a box," he said. "But the customers understand that it has nothing to do with solving their problems."

In the future, Mr. Hillis said, Thinking Machines would play down the importance of peak speed, sometimes referred to as "macho flops" in industry jargon. Such claims simply angered customers and competitors he added.

Thinking Machines, which is privately held, will have sales of about $90 million in 1991, Mr. Smaby said.

Business Day

The New York Times

Competing in the Market for $30 Million Supercomputers

A mock-up of the Cray 3 supercomputer, which consists of, from left: a power supply unit; a reservoir, which recirculates coolant, and the computer itself, including the processor and memory, which is 3 feet high.

Cray Computer Corporation

	Vendor	Architecture	Processors	Theoretical peak	Available
Cray 3	Cray Computer	Parallel vector	16	14 to 16 gigaflops*	1993
C-90	Cray Research	Parallel vector	16	14 to 16 gigaflops	1992
SX-3	NEC	Parallel vector	4	25.6 gigaflops	1992
CM-5	Thinking Machines	Massively parallel	1,024	128 gigaflops	1992

Source: Smaby Group

*A gigaflop is a billion floating point operations, or calculations, per second.

Cold War's End Hits Cray Computer

By LAWRENCE M. FISHER

Special to The New York Times

SAN FRANCISCO, Feb. 20 — The end of the cold war may have claimed an unlikely victim: Seymour Cray cannot sell his new supercomputer.

The father of the supercomputer, Mr. Cray has been an icon of American high technology for three decades. But last week, the Cray Computer Corporation, based in Colorado Springs, said it was halting development of its $30 million machine for lack of a buyer.

In December, when the Lawrence Livermore National Laboratory lost patience with delays and abruptly canceled its order for the first Cray-3, analysts assumed that someone in the defense or intelligence community would step forward with a check — just as someone had always done in the past whenever Mr. Cray introduced a supercomputer. This time, no buyer emerged.

"I don't think that anybody sees it in the best interests of the United States or the supercomputing world for the Cray-3 to fail," said Gary Smaby of the Smaby Group, a supercomputing consulting firm based in Minneapolis. "At the same time, the Government is no longer in a position to subsidize it. The whole thing gets back to the collapse of the Evil Empire."

While supercomputers are now used to design everything from automobiles to drug molecules, government agencies are still usually the first to buy a new machine. This is particularly true for a leading-edge design like the Cray-3, which is based on an unproved new semiconductor material called gallium arsenide for its chips, and will require entirely new software. Commercial buyers shy away from such risks.

Cray Computer said that while it planned to proceed with testing of the prototype in March, it could not continue development of a commercial version without a signed contract. Mr. Cray, 65 years old, founded Cray Computer in 1989 after leaving Min-

Continued on Page D2

New Supercomputers Signal Industry's Direction

By JOHN MARKOFF

A new wave of American-made supercomputers will be announced in the next month, and they are likely to set the standard for the world's fastest machines through the mid-1990's.

The first to announce formally its next-generation product will be the Thinking Machines Corporation, which is scheduled to show off its CM-5 supercomputer at a news conference today in Cambridge, Mass.

In a surprise for the industry, the company will disclose that it has adopted a chip-design standard created by Sun Microsystems Inc., a Mountain View, Calif., maker of computer work stations, according to several industry executives and scientists familiar with the new computer.

Industry in Transition

Thinking Machines' new design will be a departure from its earlier generation of Connection Machines, which chained together up to 64,000 processors to operate in lockstep. The new machine will be able to harness as many as 2,000 of the more powerful chips based on the SPARC microprocessor to work simultaneously on different streams of instructions.

Although Thinking Machines is the first to announce its new product, other companies are nearing completion of supercomputers to be announced at an industry trade show, Supercomputing 91, in Albuquerque, N.M., starting on Nov. 18.

The new machines will mark a transition in the industry from today's single-processor machines, which are synonymous with the systems designed by Seymour Cray, to the massively parallel computers like that of Thinking Machines, which harness thousands or even tens of thousands of off-the-shelf chips.

"These are going to be the most important announcements between now and 1995," said Larry Smarr, director of the National Center for Supercomputer Applications in Champaign, Ill. "You could argue that Thinking Machines has fired the first shot in the international race to a teraflop."

A teraflop is a rough measure of computer speed equivalent to the ability to compute a trillion mathematical operations a second. That amount of computing power has been defined as what is necessary to solve a set of pressing scientific problems known as "grand challenges."

The grand challenges include problems like the modeling of global climatic changes and the unraveling of the human genetic structure.

In addition to Thinking Machines, Cray Research, Intel Supercomputer and Alliant Computer Systems are all expected to announce next-generation supercomputers at the conference. Kendall Square Research, a start-up based in Waltham, Mass., planned to announce a supercomputer at the conference but decided to delay its introduction several months. I.B.M. which has been edging closer to a larger commitment to supercomputing through marketing agreements with NEC of Japan and Thinking Machines in recent months, will make a "statement of direction."

The introductions all indicate wholesale changes in the supercomputer industry that have been brought about by the increasing speed of inexpensive microprocessor chips. In the past, the fastest machines, like those pioneered by Cray Research, have been built around expensive custom-made processors. But Thinking Machines, Intel Supercomputer and other computer makers like Masspar and N-Cube have leveraged thousands of microprocessors to design machines that have potentially far higher speeds.

Many in the industry think the Cray Research C-90, an eight-processor supercomputer that the Minneapolis-based company will introduce next month, may be the last commereially successful machine of its kind.

Cray has announced plans to developed its own massively parallel supercomputer to be introduced sometime in 1993 or 1994. Seymour Cray, who founded Cray Research and then left in 1989 to start the Cray Computer Company, is building an extremely fast vector-processor design that is expected to be directed at a few specialized government and corporate customers.

"There are these dinosaurs, and then there are these new machines from companies like Thinking Machines, Intel and Kendall Square," said Jack Dongarra, a computer scientist at the University of Tennessee.

The transition from traditional supercomputers, which are referred to as vector processors because they contain special circuits to calculate large arrays of numbers, may be a particularly risky period for Cray, some analysts say.

"This is a watershed," said George Lindamood, a supercomputer industry analyst at the Gartner Group. "You have three companies here — Thinking Machines, Kendall Square and Intel — that will all come to market with 100 gigaflops a year ahead of Cray. The question in my mind is whether the industry is going to stick with Cray or will there be a mass defection." A gigaflop represents a billion calculations a second.

The new generation of supercomputers, which range from several hundred thousand dollars to more than $50 million, are seen as vital tools for engineers and scientists. Until recently the United States has had an undisputed lead in the technology. The newest supercomputers from Japan and Europe have caused growing concern for United States policy makers.

Congress recently passed a bill calling for the spending of up to $3 billion over five years for the development of high-performance computer technology and high-speed data networks.

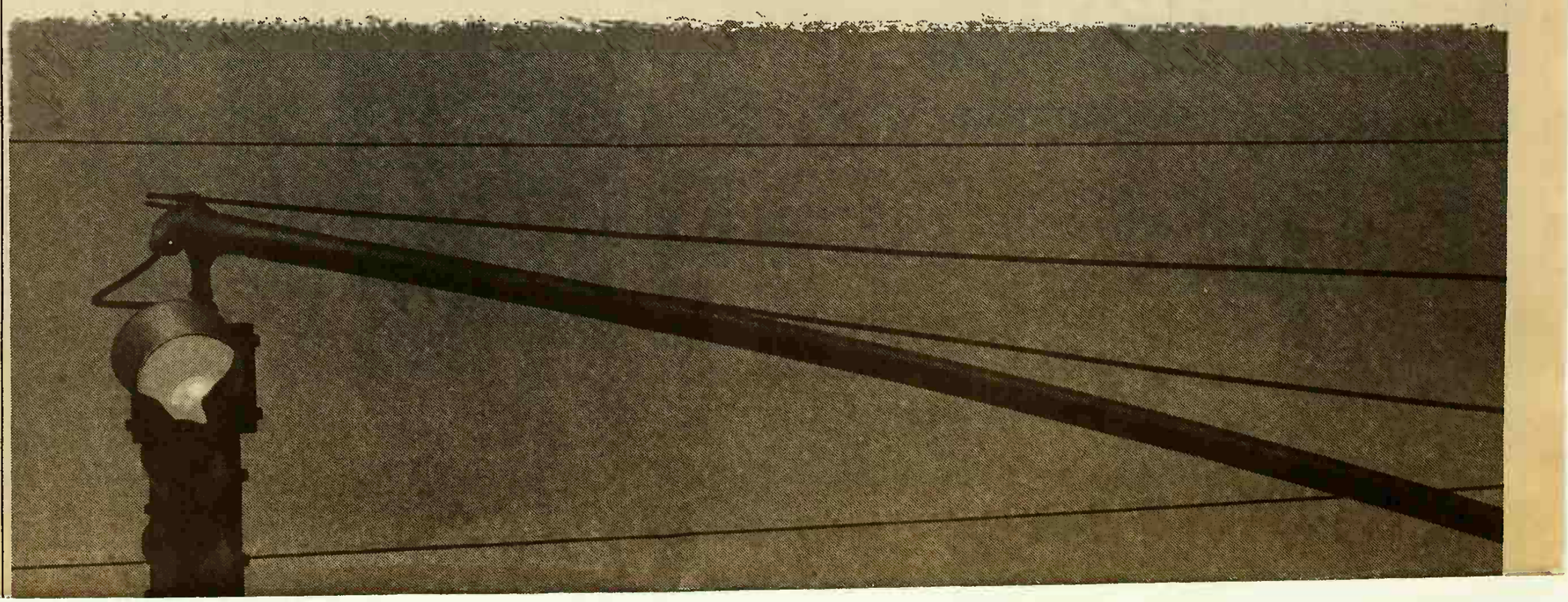
The Japanese had concentrated on building machines that were similar to Cray's vector processors. But last year Tokyo began to finance a nationwide effort to develop parallel computing technology, and Fujitsu Ltd. is selling a 500-processor machine.

New Machines From Tandem

Special to The New York Times

SAN FRANCISCO, Oct. 28 —

The end of the road for overcharges.



limits for the rest of the year, in an effort to insure that Soviet supply disruptions do not drive oil prices higher this winter. [D7.]

Taiwan may be finding Western countries willing to sell it modern military equipment to defend itself against China. [A7.]

Markets

Blue-chip stocks fluctuated in a tight range before falling slightly. The Dow lost 8.72, to 3,010.51. [D10.] Prices of Treasury securities improved slightly in slow trading. [D24.]

Prices of silver futures charged to a two-month high on technical buying stemming from perceptions that the economy is climbing out of recession. [D25.] The dollar drifted lower. [D25.]

Today's Columns

As recovery appears to stall, economists focus on a new phenmenon: Many service industries are shrinking for reasons often going beyond hard times. Louis Uchitelle: Business Scene. [D2.]

At Countrywide Credit, rapid growth and a sharp rise in its stock have led to a second stock offering. Market Place. [D10.]

Cliff Freeman has a challenging assignment: helping Child World take on Toys 'R' Us. Stuart Elliott: Advertising. [D28.]

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I.B.M. in Technology Pact With Thinking Machines

By JOHN MARKOFF

I.B.M and the Thinking Machines Corporation said yesterday that they had signed a joint development agreement to integrate the supercomputer maker's technology with I.B.M.'s mainframe computer systems.

The announcement is a further indication of the rapidly growing influence of massively parallel computing — a technology in which inexpensive microproessors break problems into hundreds or thousands of small parts.

Separately, I.B.M. and Apple Computer said their proposed alliance was necessary for restoring growth to the maturing personal computer industry [page D3].

The Thinking Machines pact raises questions about I.B.M.'s previously announced joint venture with Supercomputing Systems Inc., a Wisconsin-based supercomputer maker founded in 1987 by Steve Chen, after he left the Cray Research Corporation. Mr. Chen's approach is said to be based on a limited number of more costly custom-designed microprocessors.

Nicholas M. Donofrio, president of I.B.M.'s mainframe computer division, said, however, that the I.B.M.-Thinking Machines announcement was an entirely distinct venture from I.B.M.'s relationship with Supercomputing Systems. I.B.M. is still committed to the Supercomputing Systems project, Mr. Donofrio said. Mr. Chen did not return a telephone call seeking comment on the new agreement.

Although terms of the agreement with Thinking Machines were not announced, I.B.M. has said previously that it has been exploring ways to marry its mainframe computers with massively parallel computing systems like those made by Thinking Machines.

Among I.B.M.'s mainframe systems are versions that include specialized hardware for scientific and engineering problems. These ma-

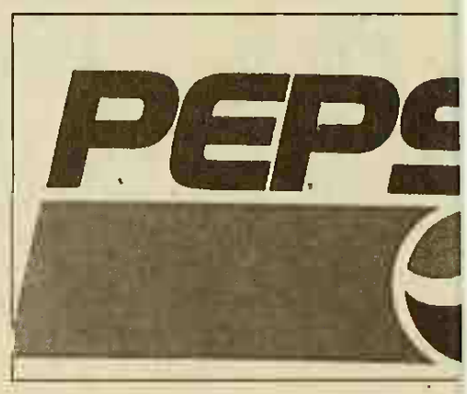
Continued on Page D3

jority of economists insist that the recession ended at least three months ago. And two members of the committee charged officially with dating it said today that the bottom most likely occurred in May.

Still, Michael J. Boskin, chief economic adviser to President Bush, persisted in expressing concern about possibly overly restrictive monetary policy by the Federal Reserve that could threaten recovery.

"If money growth doesn't pick up soon, the Fed will have to accommodate further," Mr. Boskin said after an appearance before the National Association of Business Economists at the Biltmore Hotel here.

Pepsi Gets Fa



By PETER KERR

Pepsi-Cola unveiled its new face yesterday, a logo that the company hopes will make it seem peppier and younger than its age-old rival.

The new logo, with streamlined blue letters suspended over what looks like a rolling tri-colored beach ball, comes as Pepsi attempts to press home a series of public relations victories over Coca-Cola intended to capture the attention of the nation's youngest consumers.

In the world of colas, competition means an ever-changing array of packages and imagery, while the drinks themselves remain very much the same.

"If you are Pepsi, you want to show that you are up to date, that you are current," said Tom Pirko, the president of Bevmark, a Los Angeles management consulting company that specializes in the beverage industry. "They want Coke to appear to be the cola appealing to older people."

Aim of Apple-I.B.M. Tie Is Discussed

By JOHN MARKOFF

Special to The New York Times

LAGUNA NIGUEL, Calif., Sept. 23 — The chairman of Apple Computer and the president of I.B.M.'s personal computer business explained their proposed alliance publicly for the first time at an industry conference here today. They said the partnership was intended to restore growth and innovation in the desktop computer market, which has slowed markedly as it has matured.

But the two executives refused to go beyond general comments on the new relationship, which stunned the computer world when it was announced earlier this year. A number of executives at both companies said the negotiations, which have at times involved as many as 400 people, had gone slower than had been expected, although they insisted final terms were near.

Several analysts said that the remarks made by John Sculley, Apple's chairman, and James A. Cannavino, president of the International Business Machines Corporation's personal systems group, were the clearest admission yet that deep problems confront the desktop computer business and that fundamental changes will be needed to restore growth.

'Poor State' of Business

"It's an incredible admission about the poor state of current business," said Mark Stahlman, a computer industry analyst at Alex. Brown & Sons. "They tacitly admitted that without a technological revolution, we won't see new growth in the industry."

There were also several hints today that the first commercial products from the I.B.M.-Apple joint venture might be introduced sooner than some analysts had suggested.

Mr. Sculley said that an Apple operating system known as Pink, which is the basis for part of the I.B.M.-Apple partnership, now included more than a million lines of tested software code. An operating system is software at the heart of a computer that enables it to use various other programs, like word processors or spreadsheets. Mr. Sculley indicated that Pink's introduction might not depend on developments at a new jointly owned company that is expected to be formed by the agreement.

"The major message is that Pink is not a research project," Mr. Sculley said.

Charles Woll, a computer industry analyst at First Boston, said, "They're telling us that Pink is coming first, and that I.B.M. may not be a major part of it."

Increasing Pressure

Apple and I.B.M. are under increasing pressure to bring out a new operating system based on an advanced software technology known as object-oriented programming because the Microsoft Corporation is moving quickly to develop a similar system called NT. Mr. Sculley also said that Apple would sell a version of I.B.M.'s Unix operating system known as AIX.

An admission of deep troubles in the desktop computer market.

While the new operating system plan has generated a great deal of industry interest, there are skeptics, including I.B.M.'s former partner, William Gates, chairman of the Microsoft Corporation.

"Somebody has to give me an example of a new application that requires Pink," Mr. Gates said. "They haven't explained what sets it apart." He said that his own operating system, NT, was already in limited testing outside of Microsoft.

Separately, at an early morning news conference held here, the Lotus Development Corporation, I.B.M. and Apple Computer said that they were adopting a common electronic mail standard designed to permit software programs to send and receive messages more easily.

I.B.M. May Close Unit

Special to The New York Times

SAN FRANCISCO, Sept. 23 — I.B.M. is re-evaluating and might dismantle a division that sells applications software for personal computers, industry analysts and executives said today.

I.B.M. Desktop Software, based in Millord, Conn., was created in 1988 to make the International Business Machines Corporation a major developer of personal-computer software. But the unit, whose products include the Displaywrite word-processing program and the Platinum accounting programs, has fallen short of its goals, analysts said.

"The approach they've taken of being a publisher of a whole series of unrelated applications — that's not been a very productive approach," said Jeffrey Tarter, publisher of Softletter, a newsletter that follows the software industry.

Keith Rantas, a spokeswoman for I.B.M, said I.B.M. was "re-evaluating" the division and that closing it would presumably be one of the options. She said no decision had been made.

Reports in the Trade

Two trade newspapers, PC Week and Infoworld, both citing unidentified sources at or close to I.B.M., reported today that the desktop software unit was likely to be dismantled and that new ways were being sought to distribute the products. Analysts expect I.B.M. to move toward selling other companies' programs rather than developing them on its own.

I.B.M. Desktop Software canceled a news conference last week at which it was to announce a new word-processing program, known as Signature, that it developed with Xyquest Inc. of Billerica, Mass. Xyquest is now looking for other ways to distribute the product, said Judy Mintz, the company's marketing manager.

The Desktop Software unit is separate from I.B.M. systems software, so changes there will not affect I.B.M.'s development of the OS/2 operating system or other alliances, like the company's agreement to resell the Lotus Development Corporation's Notes program.

Change Urged In Mining Law

WASHINGTON, Sept. 23 (AP) — A top Bush Administration official said today that it was time to scrap part of an 1872 mining law because of the public perception that mineral rights on Government lands were being sold too cheaply.

The director of the Bureau of Land Management, Cy Jamison, called for elimination of the law's fee structure, which allows miners to purchase valuable patents for as little as $2.50 an acre.

"I know and everybody else who understands the business knows that it may cost $10,000 to get to that point where you buy the $2.50 patent. But the public doesn't know that," he told a group of miners, loggers and ranchers. "The $2.50 fee doesn't have anything to do with the value of the land. We should get rid of it."

President Ulysses S. Grant signed the Mining Act of 1872 to help promote westward expansion. The General Accounting Office has issued reports critical of patents issued for a fraction of their value.

Instead of the cheap patent fees, Mr. Jamison said, the mineral rights should be sold based on the fair-market value of the land's surface or should be separated from the surface and sold only as a right to the mineral itself.

Mr. Jamison spoke to about 200 people gathered here to lobby against legislation they say places excessive restrictions on natural resources they depend on for their livelihoods.

U.S. Market Regulators Expanding Foreign Ties

Continued From First Business Page

Inter-American Development Bank — is expected to be signed before the conference closes on Thursday, according to senior Admininstration officials. That pact is aimed at providing technical assistance to regulators in securities markets emerging in Latin America, some of which are beginning to attract interest from Japanese, European and American pension funds.

In addition, officials of both the S.E.C. and the Commodities Futures Trading Commission, which regulates the futures markets, are expected to sign a mutual-aid pact with British regulators, replacing a more limited pact that has been in place since 1986.

That agreement is to be signed Wednesday by Mr. Breeden and Wendy Gramm, the chairman of the C.F.T.C., for the United States, and John Redwood, Minister of State for Corporate Affairs, and Sir David Walker, chairman of the Securities and Investments Board, one of the overseers of the British market.

With the inclusion of the commodities-market regulators, the new agreement sharply expands the cooperation between the two countries, senior administrators said, covering "virtually all types of cases that could arise between the two countries."

Antitrust Measure

The European Community also signed a new agreement with the United States today that calls for closer cooperation on antitrust enforcement, reflecting regulatory concern over the anticompetitive aspects of cross-border mergers. The arrangement, similar to ones the United States has with Canada, Australia and Germany, was signed by Sir Leon and by senior officials of the Justice Department and Federal Trade Commission.

In addition, the S.E.C. is preparing to conclude an enforcement agreement with Norway's banking, insurance and securities commission, and to formally sign a previously announced pact with Sweden.

Those endorsements will bring to 12 the number of bilateral agreements the agency has in place with regulators in other markets. These agreements set out the terms under which regulators will share information and assist each other in cross-border investigations of securities fraud.

Saint Laurent Profit Off

PARIS, Sept. 23 (Reuters) — The fashion house Yves Saint Laurent reported a 42 percent drop in first-half profit today, blaming the the Persian Gulf war for the decline. It said profits in the first six months of the year fell to 41 million francs ($7.2 million), on sales of 1.3 billion francs ($228 million), compared with a profit of 70.6 million francs ($12.4 million), on sales of 1.36 billion francs ($238 million) a year earlier. The Paris-based fashion company said the declines mainly resulted from the economic difficulties caused by the gulf war in the first quarter.

Watch for colorful Part 2's of The New York Times Magazine.

Technology Agreement For I.B.M.

Continued From First Business Page

chines, however, do not match the performance of those made by Cray Research and the leading Japanese supercomputer makers. Whether I.B.M. will incorporate Thinking Machines' technology into its mainframes or offer it as some sort of adjunct product remains unclear.

Thinking Machines, which was founded in part with support from the Federal Government's Defense Advanced Research Projects Agency, sells a computer that uses up to 64,000 small processors chained in tandem to attack scientific, engineering and some commercial problems.

As part of the agreement Thinking Machines will obtain access to I.B.M.'s advanced semiconductor and disk drive technology, presumably to incorporate into future generations of Thinking Machines' products. But executives at both companies said many details of the cooperation remained to be worked out.

"We've believed for some time that massively parallel computing has a role to play in scientific and technical computing," Mr. Donofrio said. "And I'd add that over time this will become a requirement for the commercial side of the business."

The I.B.M.-Thinking Machines agreement follows a similar partnership formed earlier this year by the Digital Equipment Corporation and Masspar Inc., a Silicon Valley-based vendor of massively parallel computing supercomputers.

"I.B.M. is really serious about this market segment," said George Lindamood, a market researcher at the Gartner Group. "They're saying to Digital, 'we won't concede an inch.'"

Mr. Lindamood said that the I.B.M.-Thinking Machines pact might also create new problems for Cray Research, which said earlier this year that it planned to develop its own massively parallel supercomputer. Cray currently makes vector supercomputers, which are based on a small number of processors designed from custom hardware.

Cray Research is said to have explored joint ventures with Thinking Machines and with Bolt Baranek & Newman, but did not team up with either. Instead it decided to produce its own massively parallel computer with the aid of an American semiconductor developer it has not identified.

Sheryl Handler, Thinking Machines' president, said the I.B.M. agreement "really does help us with customers who are in the I.B.M. environment."

6:30 a.m. 7:30 a.m. 8:30 a.m. 9:30 a.m.

10:30 a.m. 11:30 a.m. 12:30 p.m. 1:30 p.m.

2:30 p.m. 3:30 p.m. 4:30 p.m. 5:30 p.m.

6:30 p.m. 7:30 p.m. 8:30 p.m. 9:30 p.m.

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